Evaluation of Herbicides for the Control of Littleseed Canarygrass in Wheat –2005

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Abstract

Three herbicides, Puma, Achieve and Osprey, have been registered for the control of Littleseed Canarygrass in the last five years. Another, Pinoxaden, is being developed and should be registered in the next few years. These herbicides were compared for weed control and crop safety. All produced very good to excellent levels of control although crop injury, especially when tank mixed with broadleaf herbicides, was significant.

Introduction

Littleseed Canarygrass (phalaris minor) is the most widespread grass weed found in wheat and barley grown in the Arizona Deserts. It became widespread during the 1980's and 90's due to the absence of an effective herbicide. Achieve (Tralkoxydim) was registered in 1999 in Arizona and California and Puma (Fenoxaprop) was registered in 2000 in California . Both of these herbicides are effective on Littleseed Canarygrass and safe to both wheat and barley. Both of these herbicides are ACCase inhibitors. Resistance to this class of herbicides by Littleseed Canarygrass was confirmed in Mexico in 1996 and in the Imperial Valley of California in 2001. Resistance has not been reported or suspected in Arizona. In 2004, Osprey (Mesosulfuron) was registered in Arizona for use on wheat and Barley. Osprey uses a different mode of action than Achieve or Puma. It is a sulfony urea and it has been effective in controlling Littleseed Canarygrass with slight to moderate crop injury. Another grass herbicide for use in wheat and barley, Pinoxaden, was released for testing in Arizona in 2004. Although this is also an ACCase inhibitor, it is a "den" instead of a "fop" (fenoxaprop-puma) or "dim" (tralkoxydim-Achieve) and is effective on herbicide resistant biotypes. It was effective on Canarygrass in our trials in 2004-5. It is expected to be registered next year in the Pacific Northwest.

After more than 10 years without an effective Canarygrass herbicide, three effective products were registered between 2000 and 2004 and another is in the developmental stages. Achieve and Puma have been tested in both our trials and under field conditions and have performed well in terms of both weed control and crop safety. In the long term, there is reason for concern over the documented resistance of Littleseed Canarygrass to this family of herbicides. Both Osprey and Pinoxaden offer good solutions to this potential problem. Osprey has produced excellent weed control although questions have arisen concerning crop safety and soil residual problems to crops grown in rotation with wheat or barley that have been treated with this herbicide. Pinoxaden was in our trials for the first time this year. The crop safety and weed control with this hew herbicide, especially when tank mixed with broadleaf herbicides, needs to be further researched.

Method

A test was conducted during the 2004-5 wheat season to evaluate five grass herbicides and combinations of these herbicides with three broadleaf herbicides. One rate of Puma (fenoxaprop), Osprey (mesosulfuron), Achieve (tralkoxydim) and pinoxaden, and combinations of Osprey with MCPA, Pinoxaden with 2,4-D and Pinoxaden with Harmony Extra were included in this trial for a total of seven treatments and an untreated check. The trial was

conducted in Tacna, Arizona approximately 45 miles east of Yuma on silty loam soil. A moderate infestation of Littleseed Canarygrass (4-20/ft²) was present. Treatments were applied with a CO² backpack sprayer calibrated to apply 20gpa on 2-17-05 when the weeds were 1 leaf to tillering and the wheat was at the 4-8 leaf stage. Visual estimates of control were made 103 days after treatment, just prior to harvest. Phytotoxicity in the form of chlorosis and stunting were made at 14, 68 and 103 days after application. Plot size was 14 X 25 Ft. All treatments were replicated three times and set in a randomized complete block design. Harvest data was collected by hand harvesting a 2.09 Ft. X 2.09 Ft. square (0.001 AC.) randomly placed in each plot and using a vogal thrasher to determine weights.

Results

The results of this trial appear in Table 1. Puma, Osprey and Pinoxaden all produced excellent control of Littleseed Canarygrass. Achieve produced very good, but slightly lower levels of control. When Osprey was tank mixed with MCPA control dropped slightly. Similarly, when Pinoxaden was tank mixed with 2,4-D control was reduced from an average of 97 percent to 88.3 percent.

Phytotoxicity was significant from all treatments 14 days after treatment. Stunting and chlorosis ranged from an average of 18 percent with Puma to 47 percent with Achieve. Crop recovery was good from all treatments and dropped to an average of zero for Puma to 20 percent from the Pinoxaden/2,4-D tank mix.

Yields were effected only by the Pinoxaden/Harmony Extra tank mix. Although visual estimates of phytotoxicity from this treatment were among the highest, two other treatments, the Pinoxaden/2.4-D tank mix and Achieve, also caused moderate to high levels of phytotoxicity but did not effect yields.

Conclusions

All treatments in this trial produced very good to excellent levels of control of Littleseed Canarygrass. These levels were higher and more consistent than in past trials. Levels of phytotoxicity were also higher and more consistent than in the past trials. The 2004-05 wheat season was wetter than normal and this could have been at least partially responsible for higher levels of both control and crop injury.

Puma and Achieve continued to produce the same excellent results they have in the past trials and under commercial conditions. Osprey and Pinoxaden also produced excellent levels of control and use different chemistry that could help avoid potential herbicide resistance that has been documented by Littleseed Canarygrass in both Mexico and the Imperial Valley, California.

Acknowledgements

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Table 1. Evaluation of 7 herbicide treatments for the control of Littleseed Canarygrass in Durham wheat.

				Phytotoxicity (%)[1]				
Herbicide	**Rate (oz./AC)**	**Control (%)[1]**		**14 DAT**	**68 DAT**	**103 DAT**	**Yield (lbs./AC)[1]**	
Puma	9.6	97	a	18.3	0	0	6797	a
Osprey	4.75	98	a	33.3	1.6	3.3	6819	a
Achieve	9.2	92.6	bc	46.6	15	13.3	7400	a
Osprey + MCPA	4.75 + 32.0	91.6	cd	36.6	8.3	8.3	7128	a
Pinoxaden	8.2	97	a	30.0	6.6	5	7077	a
Pinoxaden + 2,4-D	8.2 + 16	88.3	d	33.3	18.3	20	6916	a
Pinoxaden + Harmony	8.2 + 0.3	96	ab	33.3	15	15	5381	b
Untreated	-------	0	e	0	0	0	4830	b

LSD (0.05)=4.19 LSD (0.05)=39.63

[1] Average of 4 replications